

*The  
Connecticut  
Agricultural  
Experiment  
Station,  
New Haven*

*Bulletin 883*

*October 1990*

Analysis of  
Nutrients in  
Canned Baked  
Beans and Chili

BY LESTER HANKIN  
AND VIPIN K. AGARWAL

A cooperative study by The Connecticut  
Agricultural Experiment Station and  
the Food Division of the Connecticut  
Department of Consumer Protection

CONN  
7-  
~~Aug 1, 31~~  
~~no. 883~~  
CONN  
S  
43  
.E22  
no. 883

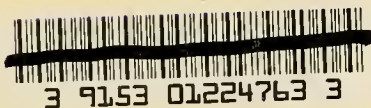
PLEASE HANDLE  
WITH CARE

University of  
Connecticut Libraries



## SUMMARY

Canned baked beans and chili were analyzed for nutrients. Results of analyses for protein, fat, carbohydrates, calories, sodium, potassium, and salt are presented on a per cup basis so that a comparison among brands may be made easily. The average amount of protein in canned baked beans was 14.2 grams per cup. The average fat content was 1.8 grams per cup, and calories averaged 282 per cup. Canned chili averaged 16.8 grams protein, 16.5 grams fat, and 363 calories per cup. For all nutrients, in both type of products, the average percentage of guarantee was close to 100% but the variability among brands was wide.



# Analysis of Nutrients in Canned Baked Beans and Chili

BY LESTER HANKIN AND VIPIN K. AGARWAL

With the current concern by consumers about good nutrition, many companies list on the label of their products the concentrations of nutrients such as protein, fat, sodium, and calories. These listings are usually given as amount per serving size. This value, the serving size, may vary among brands of the same type of product since the serving size is chosen by the manufacturer. Consumers, therefore, cannot easily compare values for nutritional claims among brands without making some calculations, and have no way of knowing if the claims are accurate.

Canned baked beans and canned chili are products popular with many consumers. In the present study we tested different brands of canned baked beans and chili to determine the validity of the nutritional claims among brands and present test data calculated to a common basis so that consumers can make comparisons for nutrients among different brands of the same product.

## METHODS

Canned baked beans and chili were collected in March, 1990 at food markets by an inspector of the Food Division of the Connecticut Department of Consumer Protection. In all, 25 samples of canned baked beans and 13 of canned chili were collected and tested.

Analyses for protein, fat, salt, ash, and total solids were by AOAC Methods (Official Methods of Analysis, 1990). Analyses for sodium and potassium were made by Analytical Methods (1982) with detection and quantitation by Inductively Coupled Plasma Mass Spectrometry. Carbohydrate content was calculated as  $(100 - (\% \text{ moisture} + \% \text{ protein} + \% \text{ fat} + \% \text{ ash}))$ . Calories were calculated by the formula:  $\% \text{ fat found} \times 8.79 + (\% \text{ total solids} - (\% \text{ fat found} + \% \text{ ash found})) \times 4$ .

## RESULTS AND DISCUSSION

Since label claims for nutrients in canned baked beans and chili are usually listed on the label as amount per

serving size, and since the serving size varies among brands, consumers may have difficulty comparing the amounts of nutrients among brands. Thus we have calculated all nutrients found, as shown in Tables 1 through 4, on a per cup basis, so that consumers can more easily compare brands for the various nutrients.

The concentrations of protein, fat, carbohydrates, and calories found in 25 samples of canned baked beans are listed in Table 1. For protein the average amount found per cup was 14.2 grams with a range from 11.4 to 17.9 grams (Table 5). Protein is usually considered by consumers to be a valuable nutrient and an excess could be considered to be satisfactory. On the other hand, excess fat, i.e., above guarantee, could be considered detrimental. The data show, for example, that protein ranged from 26% above the average to 20% below the average (Tables 5 and 1).

Fat content averaged 1.8 grams per cup and ranged from 0.3 to 4.4 grams (Table 5). Carbohydrate content averaged 52.3 grams and ranged from 44.6 to 62.2 grams, and calories averaged 282 per cup with a range from 242 to 353 (Table 5). Consumers are also concerned about total caloric intake. Samples ranged from 14% less than the average for number of calories found to 25% above the average (Table 5).

The concentrations of sodium, potassium, and salt in the canned baked beans are shown in Table 2. Results are presented as amount per cup for comparison purposes. The average amount of sodium was 843 mg per cup with a range from 171 to 1211 (Table 5). For potassium the average was 762 mg but ranged from 469 to 1219. Some samples contained 44% more sodium than the average and 60% more potassium than the average (Tables 5 and 2). No brands listed a guarantee or claim for salt content (Table 2). Salt content in all products averaged 2.1 grams per cup with a range from 0.5 to 2.9 grams (Table 5).

Twelve of the canned baked beans listed pork as an ingredient, but in only six did we find measurable pieces of pork. The average percentage of pork pieces in the product was 1.1% by weight, with a range from 0.3



to 1.9%. Some brands identified the product as "pork and beans." According to the Food and Drug Administration (Code of Federal Regulations, 1990), ingredients must be listed in descending order by weight. Thus a product with mostly beans and little pork should properly be labeled as "beans and pork" and not "pork and beans."

The concentrations of protein, fat, carbohydrates, and calories in 13 samples of canned chili are shown in Table 3. As for the beans, the nutrient content is shown on a per cup basis to allow for easier comparison among brands of chili.

For protein in canned chili the average amount per cup was 16.8 grams per cup with a range from 9.3 to 20.7 (Table 5). Fat content averaged 16.5 grams per cup but the range was extremely wide, from a low of 1.3 to a high of 32.9 grams. The average number of calories per cup was 363 but the range was wide, from 182 to 458, which is 50% less than, and 26% more than, respectively, than the average (Table 5).

Table 4 lists the concentrations of sodium, potassium, and salt found per cup of chili. Variability among brands is large. For example, the amount of sodium per cup ranged from a low of 46 mg to a high of 1326 mg. This is 94% less than, and 76% more than, the average. The sodium content is, of course, reflected in the values for salt; those with a high concentration of sodium are also high in salt. No products made a claim for salt content, but four listed on the label terms as "reduced salt", "no salt added", or "low sodium" (Table 4). These four were among the lowest in salt content as well as in sodium content (Table 4).

With the data presented in Table 1 through 4, consumers can compare nutrients among brands on a per cup basis, but they would also like to know if the products comply with the guarantees as shown on the label. Such data are shown, on the average, in Table 6 for both beans and chili. For individual samples, a comparison between amounts guaranteed and found can be found in Tables 1 through 4.

In general, for all nutrients, the average percentage of guarantee was near 100%, but many samples contained some nutrients in concentrations greater or less than claimed (Tables 1 through 4). For example, the lowest percentage of fat in beans was 14% of guarantee, and the highest was 65% above the guarantee (Table 6). Another example is sodium in chili. The lowest percentage was 21% of guarantee and the highest was 48% above the guarantee (Table 6).

#### ACKNOWLEDGEMENTS

We thank John Hayes, Mamie Pyles, and Craig Musante for the analyses and Richard Grimaldi for collecting the samples.

#### REFERENCES

- Analytical Methods for Atomic Absorption Spectrophotometry (1982) Method FP1, Perkin-Elmer, Norwalk, CT
- Code of Federal Regulations (1990) Title 21 Sec. 101, U.S. Government Printing Office, Washington, DC
- Official Methods of Analysis (1990) 15th edition, K. Helrich, editor. Association of Official Analytical Chemists, Arlington, VA.

Table 1. Analysis of canned baked beans for protein, fat, carbohydrates, and calories per cup (255 grams).  
 G = guarantee; F = amount found; gm = grams; \* = no guarantee listed.

	Protein, gm.		Fat, gm.		Carbohyd., gm.		Calories	
	G	F	G	F	G	F	G	F
<b>B &amp; M</b>								
barbecue, brick oven, sweet, smoky flavor	16.9	14.5	6.7	2.8	53.9	61.4	348	328
barbecue, brick oven, sweet, smoky flavor brick oven	16.9	14.9	6.7	1.9	53.9	58.5	348	310
vegetarian, brick oven, no meat products	15.7	17.9	6.7	3.7	56.2	62.2	303	353
	16.9	17.4	2.2	2.0	56.2	57.8	315	319
<b>CAMPBELL'S</b>								
home style	12.4	13.0	4.5	2.2	53.9	52.1	258	279
old fashioned, in brown sugar & molasses sauce	12.4	14.4	3.4	0.7	55.0	48.0	258	255
old fashioned, in brown sugar & molasses sauce	12.4	13.7	3.4	1.1	55.0	52.8	258	276
pork & beans in tomato sauce	10.1	11.4	3.4	2.0	48.3	44.6	213	242
vegetarian in tomato sauce	*	13.4	*	0.8	*	49.1	*	257
<b>FINAST</b>								
pork & beans with tomato sauce	13.0	13.6	3.0	1.6	50.0	47.5	270	258
<b>FOOD CLUB</b>								
pork & beans with tomato sauce	12.0	13.5	4.0	2.5	44.0	48.2	280	269
seasoned with bacon, baked with brown sugar	*	13.2	*	0.9	*	61.5	*	306
<b>FRIEND'S</b>								
brick oven, red kidney with pork, all natural	17.0	15.9	4.0	2.1	57.0	52.5	340	292
brick oven, small pea with pork, all natural	17.0	15.3	5.0	4.4	62.0	54.9	360	320
in maple sauce naturally flavored	*	14.7	*	1.4	*	54.8	*	290
<b>GRANDMA BROWN'S</b>								
home baked	*	15.8	*	2.1	*	54.2	*	298
<b>HANOVER</b>								
brown sugar and bacon	15.7	14.4	2.0	3.3	53.0	52.0	275	294
pork & beans in tomato sauce	14.0	15.1	2.0	1.4	42.0	47.8	240	263
<b>HEALTH VALLEY</b>								
Boston baked with honey	22.5	12.9	2.2	0.7	51.7	56.1	247	282
honey baked, vegetarian with miso	9.6	14.7	1.2	0.4	45.6	54.3	216	279
<b>HEINZ</b>								
vegetarian in tomato sauce	11.2	13.9	2.2	0.3	50.6	47.1	225	247
<b>PATHMARK</b>								
pork & beans in tomato sauce	14.0	14.4	4.0	2.5	46.0	45.7	300	262
<b>SHOPRITE</b>								
pork & beans in tomato sauce	14.0	12.5	4.0	1.2	50.0	50.4	300	262
<b>STOP &amp; SHOP</b>								
pork & beans in tomato sauce	13.5	12.3	2.2	1.5	44.9	49.5	247	260
<b>VAN CAMP'S</b>								
pork & beans in tomato sauce	12.4	13.2	2.2	1.8	46.1	44.8	202	248

Table 2. Analysis of canned baked beans for sodium, potassium, and salt per cup (255 grams).  
 G = guarantee; F = amount found; gm = grams; mg = milligrams; \* = no guarantee listed.

	Sodium, mg		Potas., mg		Salt, gm
	G	F	G	F	F
<b>B &amp; M</b>					
barbecue, brick oven, sweet, smoky flavor	1123	752	955	961	2.1
barbecue, brick oven, sweet, smoky flavor brick oven	1123	770	955	900	2.1
vegetarian, brick oven, no meat products	843	982	786	1219	2.4
	843	775	1045	1170	2.1
<b>CAMPBELL'S</b>					
home style	1011	887	*	627	2.4
old fashioned, in brown sugar & molasses sauce	820	732	*	507	1.8
old fashioned, in brown sugar & molasses sauce	820	683	*	518	1.9
pork & beans in tomato sauce	820	706	*	469	1.5
vegetarian in tomato sauce	*	836	*	525	2.1
<b>FINAST</b>					
pork & beans with tomato sauce	1180	984	*	704	2.5
<b>FOOD CLUB</b>					
pork & beans with tomato sauce	1000	908	*	625	2.5
seasoned with bacon, baked with brown sugar	*	997	*	676	2.4
<b>FRIEND'S</b>					
brick oven, red kidney with pork, all natural	1059	1028	719	778	2.6
brick oven, small pea with pork, all natural	1039	992	949	949	2.6
in maple sauce naturally flavored	*	780	*	816	2.1
<b>GRANDMA BROWN'S</b>					
home baked	*	663	*	875	1.7
<b>HANOVER</b>					
brown sugar and bacon	1040	1160	*	640	2.9
pork & beans in tomato sauce	840	966	*	887	1.1
<b>HEALTH VALLEY</b>					
Boston baked with honey	876	556	809	964	1.5
honey baked, vegetarian with miso	77	171	768	1051	0.5
<b>HEINZ</b>					
vegetarian in tomato sauce	932	844	*	561	2.1
<b>PATHMARK</b>					
pork & beans in tomato sauce	880	887	600	597	2.3
<b>SHOPRITE</b>					
pork & beans in tomato sauce	880	882	*	722	2.2
<b>STOP &amp; SHOP</b>					
pork & beans in tomato sauce	921	918	*	653	2.4
<b>VAN CAMP'S</b>					
pork & beans in tomato sauce	1123	1211	*	663	2.9

Table 3. Analysis of canned chili for protein, fat, carbohydrates, and calories per cup (255 grams).

G = guarantee; F = amount found; gm = grams; \* = no guarantee listed.

	Protein, gm		Fat, gm		Carbohyd., gm		Calories	
	G	F	G	F	G	F	G	F
<b>ARMOUR</b>								
with beans	15.6	14.4	31.1	28.6	32.3	32.7	467	440
<b>BROADCAST</b>								
no beans	*	20.7	*	32.9	*	21.4	*	458
with beans	*	16.5	*	22.7	*	31.7	*	392
<b>CASTLEBERRY'S</b>								
with beans	*	18.1	*	23.6	*	27.8	*	391
<b>FINAST</b>								
with beans	19.2	18.1	25.2	22.6	32.4	32.7	432	402
<b>HAIN</b>								
spicy vegetarian, beans & veg, reduced salt	8.4	9.3	1.2	1.3	37.2	33.4	204	182
<b>HEALTH VALLEY</b>								
mild vegetable with lentils	20.2	15.3	11.2	6.8	27.0	34.0	247	257
mild vegetarian with beans, no salt added	20.2	18.2	13.5	8.4	31.5	34.9	270	286
mild vegetarian with lentils, low sodium	18.0	16.5	13.5	6.9	31.5	32.7	270	258
spicy vegetarian with beans, no salt added	20.2	16.3	13.5	9.8	31.5	40.4	270	314
<b>HORMEL</b>								
no beans	*	19.0	*	29.3	*	20.0	*	414
<b>OLD EL PASO</b>								
with beans	*	16.3	*	9.2	*	25.6	*	249
<b>SHOPRITE</b>								
con carne with beans	16.8	19.6	15.6	12.4	31.2	35.3	336	329



Table 4. Analysis of canned chili for sodium, potassium, and salt per cup (255 grams).  
 G = guarantee; F = amount found; gm = grams; mg = milligrams; \* = no guarantee listed.

	Sodium, mg		Potas., mg		Salt, gm
	G	F	G	F	F
<b>ARMOUR</b>					
with beans	1425	1326	*	658	3.4
<b>BROADCAST</b>					
no beans	*	1002	*	686	2.8
with beans	*	1244	*	813	3.3
<b>CASTLEBERRY'S</b>					
with beans	*	1163	*	622	3.0
<b>FINAST</b>					
with beans	876	1186	*	785	3.2
<b>HAIN</b>					
spicy vegetarian, beans & veg, reduced salt	240	173	528	592	0.6
<b>HEALTH VALLEY</b>					
mild vegetable with lentils	449	367	876	951	1.2
mild vegetarian with beans, no salt added	56	46	921	992	0.3
mild vegetarian with lentils, low sodium	112	87	1033	719	0.4
spicy vegetarian with beans, no salt added	56	48	1033	1007	0.3
<b>HORMEL</b>					
no beans	*	1122	*	421	2.7
<b>OLD EL PASO</b>					
with beans	*	734	*	609	2.0
<b>SHOPRITE</b>					
con carne with beans	1259	1298	*	576	3.2



Table 5. Average values per cup (255 grams) of nutrients in canned baked beans and chili. The number in brackets is the number of samples. Gm = grams; Mg = milligrams.

Nutrients	Baked beans [25]	Chili [13]
Protein, gm	14.2±1.5 <sup>a</sup> (11.4-17.9) <sup>b</sup>	16.8±2.8 (9.3-20.7)
Fat, gm	1.8±1.0 (0.3-4.4)	16.5±10.0 (1.3-32.9)
Carbohydrates, gm	52.3±5.1 (44.6-62.2)	31.0±5.5 (20.0-40.4)
Calories, number	282±28 (242-353)	363±93 (182-458)
Sodium, mg	843±203 (171-1211)	754±507 (46-1326)
Potassium, mg	762±204 (469-1219)	726±170 (421-1007)
Salt, gm	2.1±0.5 (0.5-2.9)	2.0±1.2 (0.3-3.4)

<sup>a</sup> average ± standard deviation


<sup>b</sup> range of values

Table 6. Average percentage of guarantee found for nutrients in canned baked beans and chili.

Nutrients	Baked Beans	Chili
Protein (21) <sup>a</sup>	103 (57-153) <sup>b</sup>	(8) 94 (81-117)
Fat (21)	57 (14-165)	(8) 77 (51-108)
Carbohydrates (21)	102 (87-119)	(8) 109 (90-129)
Calories (21)	103 (86-129)	(8) 100 (89-116)
Sodium (21)	99 (64-222)	(8) 91 (72-135)
Potassium (9)	114 (94-155)	(5) 99 (70-112)

<sup>a</sup> Number of samples with guarantees

<sup>b</sup> Range of % of guarantee found



Digitized by the Internet Archive  
in 2011 with funding from  
LYRASIS members and Sloan Foundation

<http://www.archive.org/details/analysisofnutrie00hank>





The Connecticut Agricultural Experiment Station, founded in 1875, is the first experiment station in America. It is chartered by the General Assembly to make scientific inquiries and experiments regarding plants and their pests, insects, soil and water, and to perform analyses for State agencies. The laboratories of the Station are in New Haven and Windsor; its Lockwood Farm is in Hamden. Single copies of bulletins are available free upon request to Publications; Box 1106; New Haven, Connecticut 06504.

ISSN 0097-0905





University of  
Connecticut  
Libraries

---



39153029047398

